



EGUsphere, referee comment RC2
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Comment on egusphere-2022-130

Anonymous Referee #2

Referee comment on "Identification and ranking of subaerial volcanic tsunami hazard sources in Southeast Asia" by Edgar U. Zorn et al., EGU Sphere, <https://doi.org/10.5194/egusphere-2022-130-RC2>, 2022

The manuscript submitted by Dr. Zorn and the colleagues shows the potential of tsunami hazards with volcanic origins in Southeast Asia (Indonesia, Papua New Guinea, Philippines, India, etc.). The authors focused on various factors of 131 volcanoes, such as topographic features, recent volcanic activity, tsunamigenic history in the past, which are considered closely related to tsunami potential, and used a Multicriteria Decision Analysis (MCDA) for the hazard assessment. Then, they found 19 with particularly high tsunami hazard potential, some of which less known and monitored.

While their assessment could not avoid their subjectivity in their definitions of the weights and the points in MCDA, the presented assessment that widely covers major volcanoes in this region is useful to consider tsunami potentials and for further consideration of volcanic tsunami potential at each volcano. I think this manuscript still has some parts to be improved, as listed below, but I believe that this manuscript has the potential to become suitable for publication from NHESS after major revisions.

[Major comments]

1. The objectivity of each factor used in MCDA

In MCDA, the authors considered different factors (H/D-Ratio, Volcanic activity, Tsunamigenic history, Slope angle, and Hazardous Features [Underwater extent, Morphological features, Vegetation, Hydrothermal alteration, Topography between an edifice and the sea]). I suppose that these factors are different in terms of objectivity and uncertainty; in other words, some are objective, while others contain error or subjectivity. For example, H/D-Ratio, slope angle, volcanic activity (if limited to recent activity), and underwater extent are based on rather reliable data. On the other hand, tsunamigenic history should contain many missing events (as the authors mentioned), morphological features cannot be simply quantitatively related to the hazard assessment, the effects of vegetations on edifice stability would depend on their type, etc... I recommend that the authors first use only "more objective" factors, and then add "less objective factors" (at least, please show results only with "more objective" factors, in the supplementary). It would be very helpful for readers' understanding of what are the main factors determining the potential of volcanic hazards.

2. Similar factors in MCDA

Factors of *morphological features* and *hydrothermal alternation* seem to be related to the factor of *volcanic activity*. It seems that these related factors increase the scores for volcanoes that recently erupted. Please show how these factors are correlated with each other. If the correlations are large, some of the factors might be removed.

3. Potential spatial impact of volcanogenic tsunamis

The map in Fig. 7 does not add any important information, since the heat map of the volcanic tsunamis' spatial impact shows high density around the high-hazard volcanoes, which is obvious. Also, the assessment of the spatial impacts only based on the tsunami travel times is disappointing. To consider the hazard, tsunami amplitudes on coasts should be taken into account. I understand that it is difficult to assume complex volcanic tsunami sources, the authors are recommended to conduct numerical simulations using linear long-wave models, at least with a simple tsunami source model (for example, a Gaussian-shape uplift on the sea surface).

[Minor comments]

Title: As the authors mentioned, submarine volcanoes are not considered in this study. Hence, it would be better to add such as *subaerial volcanoes, volcanoes on land*, or equivalent words to the title.

L35: *causing some 26% of all volcano induced fatalities*

This part is unclear. Do you mean "26% of all volcanoes causing tsunamis"? or 26 % of all volcanoes in the world (irrespective to tsunami generation)?

L88: *although in some circumstances*

In what circumstances do volcanoes inland exceed such a distance? Please mention some examples.

Figure 2:

Here the authors show only a case of Nila volcano in the high hazard category. At least, please show volcanoes in the other two categories for comparison.

L606- Conclusions

I recommend that the authors add one or a few sentences stating the limitations of this

analysis (containing subjectivity and/or errors more or less).